REMARKS/ARGUMENTS

Claims 1, 8, 9, 10, 17, 18, 19, and 20 are amended, claims 2-4 and 11-13 are canceled, and new claims 22-26 are added herein. With entry of this amendment, claims 1, 5-10, and 14-26 will be pending.

Claims 1-21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,965,942 (Young et al.) and further in view of U.S. Patent No. 6,674,730 (Moerder).

Young et al. describe a system for improving throughput over WLANs with mode switching. The system sets a contention window value that is lower than that set by the IEEE 802.11 standard. Factors considered in determining the load and establishing the contention window include number of transmissions, number of receptions, and number of collisions. Young et al. do not measure link delays between a root bridge and non-root bridges. In rejecting the claims, the Examiner refers, for example, to claim 1 (col. 10, lines 45-67). Claim 1 describes measuring a load of traffic and includes determining a number of transmissions, and number of collisions. These measurements are performed to determine the overall load conditions of the network, rather than specific condition (such as link delay) between two points in the network. The Examiner even notes that Young et al. do not specifically show link delays.

In the Response to Arguments, the Examiner argues that the load conditions monitored by Young et al. may relate to data propagation or link delays. However, Young et al. do not use link delays or any type of measurement to coordinate transmissions. As described above, Young et al. use load conditions to establish a contention window, which is used to determine a backoff period (delay). Young et al. improve throughput by reducing the contention window, and thus the delay. In a lightly loaded network, the delay can be reduced without increasing collisions. In contrast to Young et al., applicants' invention uses a measurement to coordinate transmissions. The coordinated transmissions between the root bridge and plurality of non-root bridges

reduce the probability of collisions. The claims, as amended, further specify that contention timing boundaries are aligned based on the measured link delays. Thus, the measured link delays are used to align contention time boundaries and modify system time slot to reduce packet collision probability and therefore improve overall system throughput. Applicants' invention improves throughput by coordinating transmissions based on the measured link delay, whereas Young et al. improve throughput by reducing delay.

The Moerder patent is directed to a method and apparatus for time synchronization in a communication system. In order to synchronize remote units to a common time, a hub station periodically sends a timing indication. When the remote unit receives a time indication from the hub station, it sets the transmission clock equal to the time indication advanced by the determined transmission delay. A time offset between the time of receipt of a time tag transmission and a predetermined absolute time indicates an error in estimating a forward link delay associated with forward link channels as perceived by the remote unit.

Even assuming, for the sake of discussion, that one would look to Moerder to modify Young et al., this would not necessarily lead to Applicants' invention. In particular, the invention defined by claim 1 specifically requires the use of measured link delays to coordinate transmissions in a CSMA/CA scheme. Young et al. use load conditions to determine if they can reduce a backoff period, and thereby improve throughput. A timing indication used by Moerder would not help Young et al. determine load conditions, and therefore would not be used to establish a new backoff period.

Claim 1 has been further amended to specify calculating a common time slot value based on the measured link delays and distributing the measured link delays and common time slot value. In rejecting claim 2, the Examiner refers to Col. 7, lines 22-55 and col. 8, lines 12-67 of Young et al. Col. 7 describes conventional CSMA/CA contention based on IEEE 802.11 CF access mechanism. Col. 8 describes a virtual carrier sense mechanism of IEEE 802.11. Conventional CSMA/CA operation as disclosed in Young et al. provide no shared understanding of system timing, thus, there is

a much higher probability of collisions due to breakdown of the MAC layer collision avoidance mechanism. For example, when a new packet RTS or CTS is heard, the NAV time is set based on this duration field. Until this timer expires, the medium is considered to be busy. Expiration of a prospective transmitter's NAV timer may not be a realistic indication of medium availability from the perspective of the intended receiver. At the conclusion of the busy period, a transmitter that begins a transmission right at the beginning of a slot may potentially collide with other transmitters that are beginning transmission on that slot or some portion of the previous slot due to the varying understanding of the slot boundaries and delayed detection of simultaneous transmissions due to link propagation delays. As link distances increase, packet collision probabilities will also increase unless timing boundaries are well understood at all stations.

Furthermore, conventional physical layer carrier sense mechanisms may not be helpful in a wireless campus network due to a hidden terminal problem. Thus, much larger collision probabilities can be expected when conventional 802.11 techniques are extended to campus-scale wireless networks. The claimed invention adapts 802.11 techniques to networks with larger propagation delays, such as campus point-to multipoint wireless networks. Applicants' invention is particularly advantageous in that aligning contention timing boundaries and modifying the system time slot based on measured link delays is very effective in reducing packet collision probability.

Accordingly, claims 1, 8, 9, 10, 17, 18, 19, and 20, and the claims depending therefrom, are submitted as patentable over the cited references.

With regard to claim 5, Moerder uses a timing indication signal that is received by a remote unit. It is the remote unit that monitors a signal from the hub to determine when to synchronize. The hub does not perform any measurements.

Claim 7 is further submitted as patentable because neither reference teaches giving access preference to more distant non-root bridges.

Claim 21 specifies that coordinating transmissions comprises adjusting a network allocation vector time. As discussed above, Young et al. establish a new contention

window value. None of the cited references show or suggest using any factor to adjust a network allocation vector time to coordinate transmissions in a CSMA/CA scheme.

For the foregoing reasons, Applicants believe that all of the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite prosecution of the application, please do not hesitate to call the undersigned at (408) 399-5608.

Respectfully submitted,

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